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NAVAL MODEL PRIORITIES
FOR
RAND STRATEGY ASSESSMENT SYSTEM

by

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Paper discusses specific accomplishments and problems regarding naval models in the RAND Strategy Assessment System (RSAS), and makes recommendations for priorities desired by the Naval Postgraduate School in the RAND program for FY 89. Emphasis is on the improvements needed to conduct research on the inter-relationship between warfare at sea and the war ashore.

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NAVAL MODEL PRIORITIES FOR THE RAND STRATEGY ASSESSMENT SYSTEM

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CONTENTS

1. Introduction. In August 1988, RAND Corporation analysts prepared a preliminary summary of RSAS release 3.5, which discussed the capabilities and limitations of that release along with the enhancements that the project leaders believed were necessary for planning Fiscal Year 1989 development. The summary also provided an update on user assistance regarding input/output and critical parameters for the RSAS.

It appears from a user standpoint that release 3.5 is a considerable improvement over release 3.0, particularly with regard to the naval models. RSAS users can now conduct a reasonable naval war at sea even with the known RSAS limitations, but the main problem now is the integration of the naval war at sea with the war ashore, to include the testing of various factors and alternatives to determine the inter-relationship between these two aspects of warfare.

The basic overall statement regarding naval requirements is contained in Part V of the Tritten & Channell Technical Report on the RSAS installation at the NPS. These requirements were commented on, and certain aspects were developed further in the Technical Report by R. N. Channell on problems in modeling navies. For a discussion of the issue of the uniqueness of naval warfare, see the NPS Technical Report by James Tritten on "Is Naval Warfare Unique?".

The increased degree of flexibility as well as complexity in the naval models of RSAS 3.5 is apparent by the number of naval and naval related parameters that can be modified. Appendix A is a RAND listing of selected parameters for the naval and sealift models that can be modified using the "set" input to the RSAS

Force Window. It is interesting to note that RAND has stated that these naval parameters are among the most sensitive in the CAMPAIGN model, and thus must be treated with great care.

This report assumes a certain degree of familiarity on the part of the reader with the RSAS and naval warfare. First time readers may wish to explore the above referenced technical reports for background details.

2. Naval Warfare Priorities. Previous reports on naval warfare models have not necessarily listed requirements in priority order. While the priorities are somewhat difficult to state due to the inter-relationships of the various aspects of naval warfare, in response to a request from the RAND project managers to indicate priorities, the following listing comprises the urgent RSAS naval warfare priorities for the Naval Postgraduate School:

a. Carrier Battle Group Improvements.

(1) The current method of conducting carrier battle group (CVBG) air wing strikes against Red surface groups is too cumbersome, requiring the entry of too much detail for a strategy level simulation. It is recommended that standard air wing tactics be entered as the default with minimum variables to change the intensity of the strike, the proportion of the air wing involved, and the nature of the target. There should also be an easy means of launching an attack using up to three carrier air wings at the same time.

(2) Attacking weapons from both Blue and Red sides must be distributed against attacked groups to reflect efforts to concentrate on the primary target, and to use EW and other means

to deflect this targeting. In addition, a procedure must be developed to indicate that the capability of the carrier to operate aircraft has been derogated rather than moving from "fully ready" to "sunk".

(3) The Blue shore air defenses need to be integrated with the air situation over the ocean in certain areas including the Norwegian Sea, North Sea, Northeast Atlantic, Mediterranean Sea, Northern Indian Ocean, Northwest Pacific, and the Bering Sea. This integration is necessary to attrite Red shore based aircraft as they transit to attack targets at sea, and to maintain continuity on aircraft for both sides.

(4) The CVBG air wing can currently support the war ashore by contributing sorties to the general air plan being executed as part of the air-land battle. To permit the study of the impact of CVBG air operations, the RSAS must be able to identify the naval generated missions, and the large scale naval strikes, particularly in AFNORTH and AFSOUTH where this type of operation should contribute significantly to the battle ashore. As noted above, the method of generating an air wing attack is too cumbersome, and needs a default to standard tactics.

b. Nuclear Forces.

(1) For the future study of the impact of naval weapons on the war ashore, it is essential that attacks by SLCM/TLAM-N's be integrated into theater nuclear war in the form of a unique attacking and penetrating unit rather than simply another bomber/ missile to be aggregated into the total. This will permit the careful study of the contribution these weapons can make to the

land battle.

(2) The RSAS must permit the use of naval strategic assets (SSBN's and TLAM-N's) for theater nuclear warfare, so that new concepts can be studied in this area. This will be required for both Red and Blue forces.

(3) The capability to conduct nuclear warfare outside the European/NATO areas must be improved to permit study of options in this regard. Korea is high priority for this improvement to meet current NPS research plans.

c. ASW.

(1) The importance of sea basins to ASW must be reflected in at least the high use ocean areas listed under the carrier battle group requirements above, and in the Arctic Ocean and the Barents Sea as well. ASW play must take place in these areas in detail, to include submarines, surface ASW ships, Maritime Patrol Aircraft (MPA), and carrier battle group ASW assets.

(2) Locational data in the key ASW areas must be in lat/long blocks. See the paragraph on ship locations below for additional comment.

(3) ASW simulation must include the capability to use nuclear weapons.

(4) The ASW algorithms appear to run well for "one on one", but deteriorate when extrapolated to "many on many".

d. Strategic Lift - Sea.

(1) Seaborne strategic lift must be developed to include the loadout, movement, and offloading of essential war equipment and supplies, so that this important relationship between the maritime campaign and the land campaign can be ex-

plored. The RSAS must be able to form and move convoys, and these convoys must be able to be taken under attack by available submarine and air units, and by mines. The crucial movement of supplies across the North Atlantic and the further distribution by sea to the other NATO regions is a key point for study.

(2) Port closures must also have an effect upon the sealift, and must include air attack, mining, and sabotage. Repair rates for key ports should be established and aggregated.

(3) The overall lift loss must be folded into the air-land battle so that loss of essential war equipment and supplies is a factor. This is another major factor in the relationship of the war at sea to the war ashore.

e. Ocean Surveillance.

(1) Ocean surveillance is played in a very limited manner at present, essentially consisting of a SOSUS factor and an index for "offboard surveillance". It is recognized that details in this area are classified and sensitive, but overall gross estimates can be made. In any event, improvement in surveillance monitoring by both sides is needed.

(2) To improve the detection and tracking of naval units on both sides, a modified ocean surveillance system is recommended, to include accounting for the more commonly used sensors for locating units at sea. A useful approach would be to develop a multi-dimensional matrix to include SOSUS, HFDF, and space capabilities for each ocean area, and including a script capable modifier for each index to permit adjustments.

f. Amphibious Warfare.

(1) The RSAS must be able to load out marine units in their typical embarked formations, using aggregate numbers of ships to lift the units. The amphibious group must be capable of conducting transits, taking attacks and losses, landing marines unopposed, or opposed with appropriate attrition, and then adding the marines to the ground battle as appropriate. Similar capabilities are required for the Red naval infantry and lift units.

(2) Marine air support must be included in the amphibious warfare operations noted above.

g. Mine Warfare.

Improvements have been made; however, additional procedures are required to permit better play. Minelaying force availability must be considered as a factor in limiting the number of mines sown, and minesweeping forces must be simulated so that a reasonable number of mines is destroyed.

h. Logistics.

It is recommended that a start be made regarding the logistics support of naval forces at sea. Initially, factors need to be developed for underway replenishment of at least fuel, ammunition, missiles, and bombs. This will require the establishment and protection of underway replenishment groups, which could run in the background, but must provide a limit on naval operations.

3. Analytic War Plans. Additional Analytic War Plans (AWP's) are required to depict such standard sea strategies as the "swing", and the "maritime", and to provide the flexibility to test other differing strategies. The naval plans should be part of the

CINCLANT and CINCPAC AWP's, and there should be plans for SACLANT to conduct naval operations, and to support SACEUR. In this regard, the Red side naval AWP's need to be developed to reflect Soviet doctrines of "bastion", lines of surveillance and attack, tattletales and reconnaissance, and the coordinated strike. Since many of these plans cross Soviet theater (TVD) boundaries, these plans should be developed under the appropriate commander.

The command structure of the U.S. forces should be as close to the real world as possible. Several of the unified and specified commands are missing from the RSAS structure. If these commands are included as part of JCS for the RSAS evolution, this should be clearly explained. Command and control of forces is a major issue for both sides, and should be simulated as realistically as possible.

4. Combat Operations in Other Theaters. As noted above, NPS has an urgent requirement for the updating and improvement of warfare in the Korean area, particularly with regard to potential nuclear warfare and the relationship of the war at sea to the war ashore. This will require the integration of tactical air, SLCM's, TLAM-N's, and SSBN's so that new concepts can be examined. NPS also requires models for Cuba and Iceland to ensure that a proper analysis of the relationship of the war in Europe and the war at sea can be accomplished. Cuba and Iceland are important in this regard, particularly for coordination with the naval campaign.

5. Ship Locations. This problem must be addressed. The use of large ocean areas in the RSAS is not acceptable to naval officers, and is undermining attempts to gain acceptance of the

RSAS. It is recommended that lat/long blocks of some sort be developed for the ocean areas listed under the carrier battle group and ASW requirements above, and that the RSAS be redesigned to use these blocks for sea warfare. The new "rolling globe" presentation for naval units is a superb graphic, but appears to be only partly integrated with CAMPAIGN model. Battle groups moved by "order", for example, appear to change their location on the rolling globe. However, during the course of CAMPAIGN execution, battle group moves and losses do not seem to be reflected on the rolling globe.

6. Database. It is imperative that the database be kept reasonably current. The 1985 default database is rapidly aging. The plan to modify the database with updated material for specific requirements will likely result in a confused and difficult RSAS database. Users will lose confidence in the RSAS if the database is allowed to become out of date, and will turn elsewhere for their gaming and simulation system.

7. Warfare at Sea and the War Ashore. It is recognized that the RSAS is being called upon to do many things, and it is necessary to keep the system running at high speed, but the naval improvements listed above are essential if the RSAS is to become useful to naval analysts and players. Above all, NPS needs sufficient RSAS capability to be able to demonstrate the relationship of warfare at sea to the war ashore. NPS is moving into studies requiring increased use of the RSAS. The requirements for naval and naval related models need to be assigned higher priority to

ensure that they will be available. The RSAS is the only simulation in operation that has a reasonable capability of integrating the war at sea with the war ashore. Improved naval models are essential to this effort.

Appendix A

SELECTED NAVAL AND SEALIFT PARAMETERS

Parameter	Table	Resolution	Description
General Effectiveness:			
navy_mult	govt	government	Multiplier of national naval capability.
sink	vessel	vessel	Sinks the ship referenced.
survival	vessel	vessel	Sets ship survival level.
ASW Adjudication:			
asw_base	naval	sea region	Basic ASW attrition rate.
atkr_trst	naval	sea region	Relative ASW losses to defending
atkr_evade	naval	sea region	submarines that are in transit,
atkr_other	naval	sea region	SSBN's on-station, and others.
ctrk_trst	naval	sea region	Relative ASW losses to attacking
ctrk_other	naval	sea region	subs, in transit, and others.
asw_exponent	force	all	Scales multi-platform ASW relative to 1-on-1 engagements.
asw_val	class	class	ASW capability of this class.
asw_vuln	class	class	ASW vulnerability of this class.
fast_asw	force	all	Multipliers of ASW effectiveness
fast_vuln	force	all	and vulnerability during fast transit.
arctic_asw	force	all	Effect of ice on ASW by season.
engage_mult	choke	choke pnts	ASW intensity in a choke.
diesel_mult	choke	choke pnts	Relative capability and vulner-
diesel_vuln	choke	choke pnts	ability of diesel subs in a choke point.
sosus	naval	sea region	Effect of area sensor on ASW capability.
AAW Adjudication :			
aaw_min	sea	group type	Bounds for imposing an entry
aaw_max	sea	group type	price for AAW defenses.
entry_min	sea	group type	Bounds on the entry price for
entry_max	sea	group type	AAW defenses.
small_attack	sea	group type	Attack size below which entry-min is used.
long_attr	sea	group type	Percent of engaged attackers lost
short_attr	sea	group type	to long & short range defenses.
aaw_msl_lr	vessel	vessel	Long-range AAW weapon inventory.
aaw_msl_sr	vessel	vessel	Short-range AAW weapon inventory.
aaw_msl_lr	class	class	Initial load of long-range AAW weapons.
aaw_msl_sr	class	class	Initial load of short-range AAW weapons.

Parameter	Table	Resolution	Description
AAW Adjudication (cont'd):			
deflect	force	all	Probability that US EW deflects attacking missile from target.
reacquire	force	all	Probability that deflected weapon will reacquire some target.
ecm_mult	govt	government	National ECM effectiveness (US=1).
aaw_mult	naval	sea region	Multiplier AAW supplies and saturation.
aaw_sat_lr	class	class	Saturation levels for long-range
aaw_sat_sr	class	class	and short-range AAW by class.
ASuW Adjudication:			
hit-capacity	class	class	Hits required to sink this class.
degrade	sea	ship type	Fraction of AAW/ASW capability lost by taking hits.
preferential	force	all	Probability attacker can focus attack on key ships, given intelligence.
cv-surveil	force	all	Duration of advantage from reconnaissance of battle group.
offboard-sen	naval	sea region	Scripts presence of surveillance.
hits	vessel	group	Scripts hits on a battle group.
Mine Warfare:			
mine-lay	choke	choke pnts	Lays more mines in choke point.
mine-effect	naval	sea region	Hits achieved by mines/km of track width.
mcm-deploy	choke	choke pnts	Sets quantity of MCM assets in choke point.
mcm_rate	naval	sea region	Sq kms cleared by one MCM asset per day.
Movement:			
avoid-suez	govt	government	Determines whether forces route
use-suez	govt	government	through the Suez and Panama
avoid-czone	govt	government	Canals.
use-czone	govt	government	
green-delay	choke	choke pnts	Imposes delay in crossing choke
blue-delay	choke	choke pnts	points for Green, Blue, Red,
red-delay	choke	choke pnts	and all forces.
damage	choke	choke pnts	

Parameter	Table	Description
Sealift (may be same as "Movement" above):		
damage	choke	Scripts damage to Suez, Panama, Bosporus.
blue_delay	choke	Scripts political delays or closures to
red_delay	choke	blue, red or green ships at Suez,
green_delay	choke	Panama, Bosporus.
mine_lay	choke	Scripts employment of mines and mine counter-
mcm_deploy	choke	measures at maritime choke points.
cargo_factor	force	Cargo space utilization in ship slack space.
avoid_suez	govt	Set national guidance concerning the use
avoid_czone	govt	of Suez and Panama canals for use by the
use_suez	govt	sealift and naval combatant routine
use_czone	govt	module.
ue_convert	mobility	Reclassify sealift between two classes of
cgo_convert	mobility	ships.
convoy_dmg	mobility	Script damage to sealift.
sealft_loss	region	Scripted loss rate for sealift.

Appendix B

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